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Application of gamma ray techniques in cell culture medium sterilization

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Abstract

© 2016, International Journal of Pharmacy and Technology. All rights reserved.Objective of this study was the search for the optimal modes of gamma-ray decontamination of culture media used for virus reproduction. The following culture media were used in the study: Eagle's Minimum Essential Medium (EMEM), medium 199, lactalbuminhydrolyzate medium, Hanks' balanced salt solution (HBSS), plain broth, plain agar, Kitt-Tarozzi medium, thioglycolate medium, Sabouraud agar, bovine serum; as well as transplantable cell culture lines: calf kidney (MDBK), bovine embryo lung (LEK), African green monkey kidney epithelium (Vero). To simulate the artificial cell contamination the asporogenous (St. aureus, E. coli) and sporogenous (B. subtils) bacteria and infectious bovine rhinotracheitis (IRT) and parainfluenza-3 (PI-3) viruseswere used. Simulation of artificial contamination of culture media was performed by adding 0.2 ml of the virus suspension with a titer of virus 6.0 lg of tissue cytopathic dose (TCD 50/ml) and bacterial agents at a dose of 1.5×106 CFU/ml to 100 ml culture media. Both native and contaminated culture media were subjected to gamma-irradiation using the device "Issledovatel" IN-1 (Russia) in the dose range of 0.1 to 1.0×104Gy. The results of microbiological studies have shown that the required doses of gamma rays for the decontamination of native dry media ranged 0.5 to 1.0×104Gy, and for liquid media - 1.0 to 2.0×104Gy. A reliable radiosterilization was achieved at artificial contamination at a dose of gamma rays of 3.0×104Gy. The results of karyological and biochemical studies have shown that exposure to culture media at the indicated doses did not result in significant changes in their basic parameters, such as transparency, pH, total protein and its fractional composition, and lipids. The results obtained during the investigation of the influence of irradiated environments on growth performance and reproduction of cell culture lines on the irradiated culture media did not differ from those cultured on the unexposed (control) media.

Keywords

Genome instability, Radiation biotechnology, Radiostimulation, Viruses